

MPE-TurboIMAGE ***To*** ***HPUX-ORACLE*** ***Migration***

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iMaxsoft Corporation



iMaxsoft

iMaxsoft Agenda

- Some Basic Concepts
- HP e3000 TurboIMAGE to ORACLE Transformation
- HP9000 ORACLE Database Creation
- Emulator
- Translator
- Demo - OpenTURBO
- Q & A

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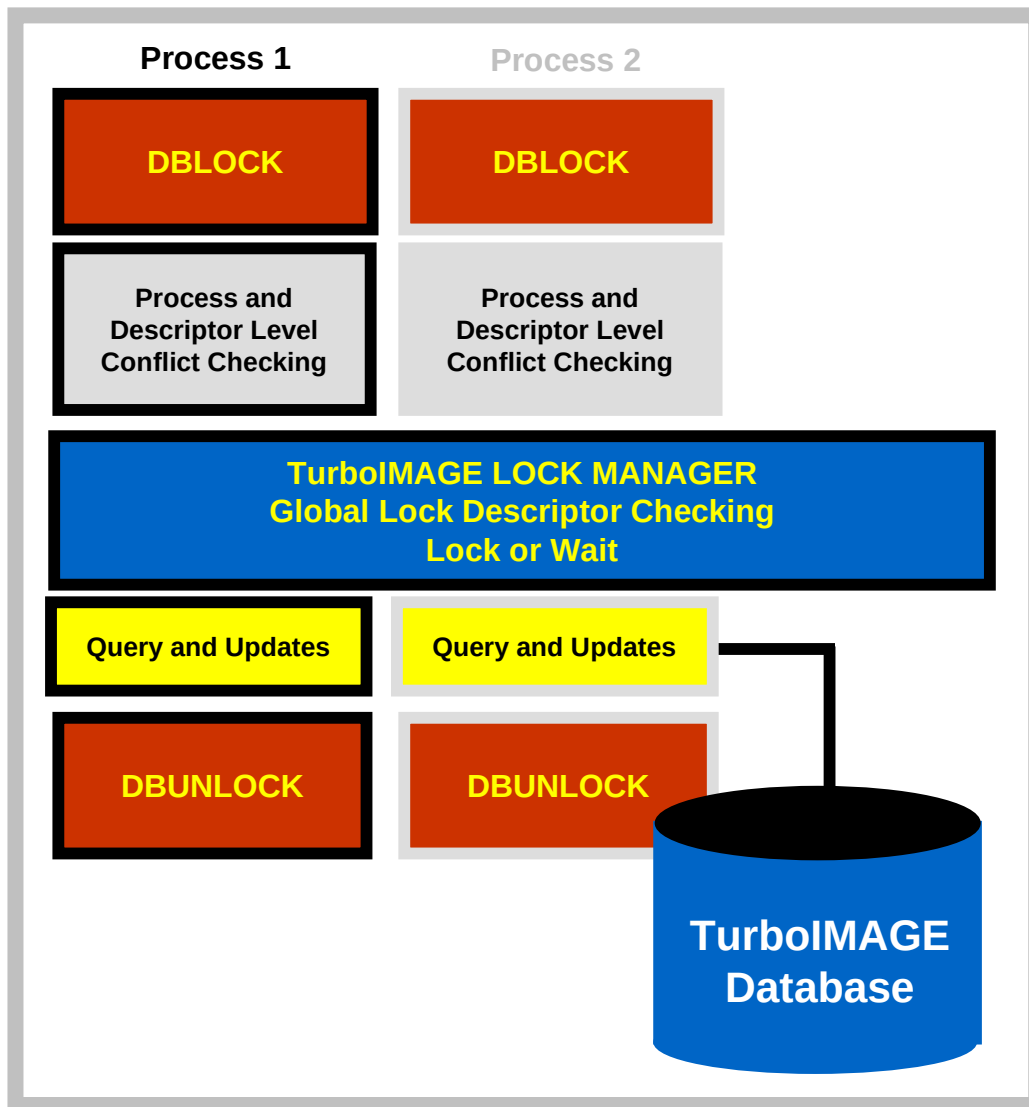
1. Basic Concept - ORACLE

- SQL-DML, SQL-DDL, and sqlplus vs TurboIMAGE API, QUERY, DBSCHEM, DBUTIL, Adager, and DBGeneral
- INSTANCE, ALLBASE/SQL DBE vs TurboIMAGE Database
- TABLE and TABLESPACE vs TurboIMAGE Dataset and MPE File
- INDEX vs TurboIMAGE Hash and B-tree, SUPERDEX and OMIDEX
- ROW, PAGE, TABLE and DATABASE locks vs TurboIMAGE Predicate, Dataset, and Database locks
- Name Space, Authority, and Security vs TurboIMAGE Password and Class
- Embedded SQL and Pre-processor vs TurboIMAGE API Intrinsics

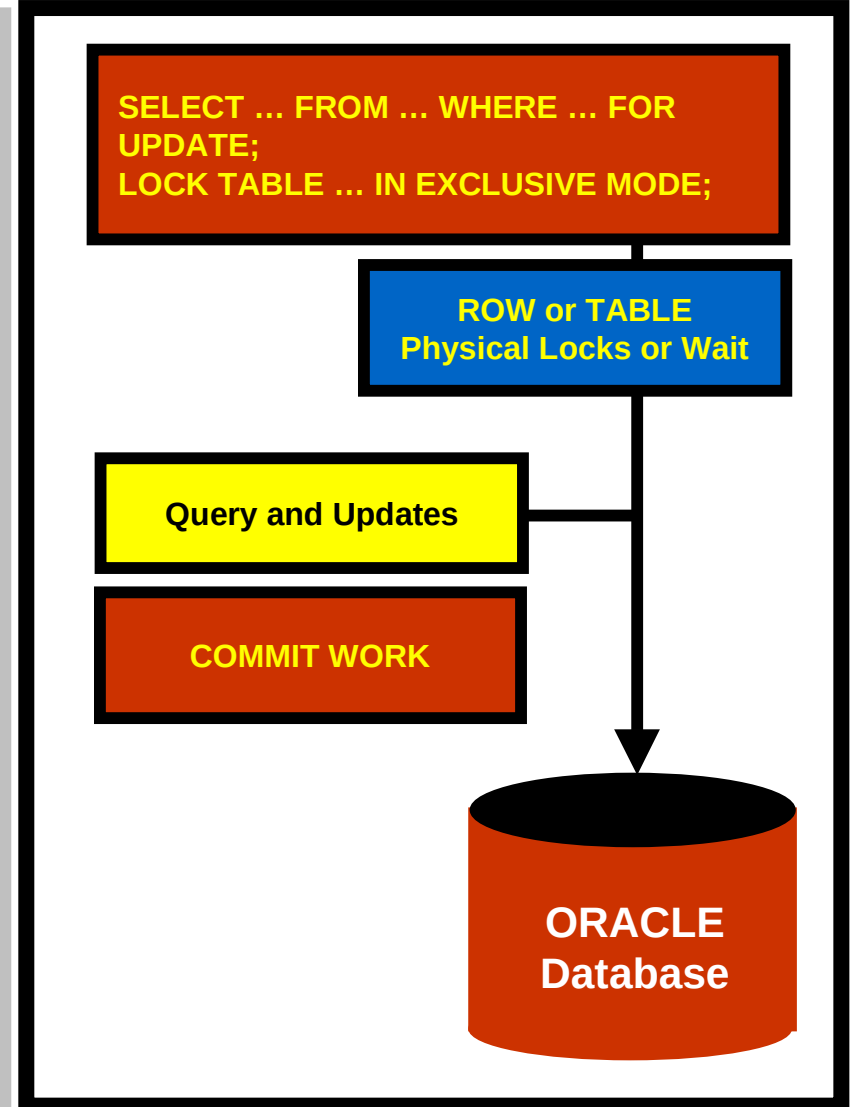
1. Basic Concept - ORACLE

Description	TurboIMAGE	ORACLE
An Instance is a group of databases, users and owners	Database or DBE (IMAGE/SQL)	Instance, Owner and User
Data Record, Row and Page	Dataset	Table, View
Index and Data Retrieval Technology	Hash, B++, OMIDEX, SUPERDEX	B++, Cluster, Vector, Hash
Physical Database Storage	Record and MPE File	TABLESPACES – shared (PAGE)
Constrain	Automatic and Manual --> Detail	Primary, Foreign, Unique
Trigger, Stored Procedure, Sequence, Queue, ... , etc.	-	ANSI SQL and ORACLE
DML – Cursor, Query, Query-Plan, Aggregate Function	DBFIND, DBGET, DBCONTROL	SELECT, EXPLAIN PLAN, Query Performance Hints
DML – Update	DBPUT, DBUPDATE, DBDELETE	INSERT, UPDATE, DELETE
DML – Locking	DBLOCK, DBUNLOCK – DB, SET, ITEM Abstract Lock Descriptor	ROW and TABLE Physical Locks
DML –Transaction, Locking and Isolation LOCK ORDER Enforcement – DB, TABLE or SET, COLUMN or ITEM ordered by Names	DBXBEGIN, DBXEND, DBXUNDO No Transaction Isolation Support Dirty Read Only (Read Uncommitted)	SELECT .. FROM .. WHERE .. FOR UPDATE; LOCK TABLE .. IN EXCLUSIVE MODE; Read Committed (Default) or RR, and 2PC
DDL – Database Structure Manipulation	Adager DBGeneral, DBSCHEM, DBUTIL	CREATE, ALTER, . . .
Utilities – Data Control, Import and Export	QUERY, SUPRTOOL	DBAQ(GUI), sqlplus, sqldr and Server Manager(GUI)
Logging and Auditing	IMAGE-LOG and DBAUDIT	ARCHIEVE LOG and AUDIT
High Availability, Backup and Recovery	Fundamental	More Comprehensive (HP-UX)
SQL Net and TurboIMAGE Remote Access	RDA (DSLIN)	Client-Server N-tier Architecture
ODBC, JDBC, Foreign Database Access	3 rd Party Solutions	Bundled

TurboIMAGE

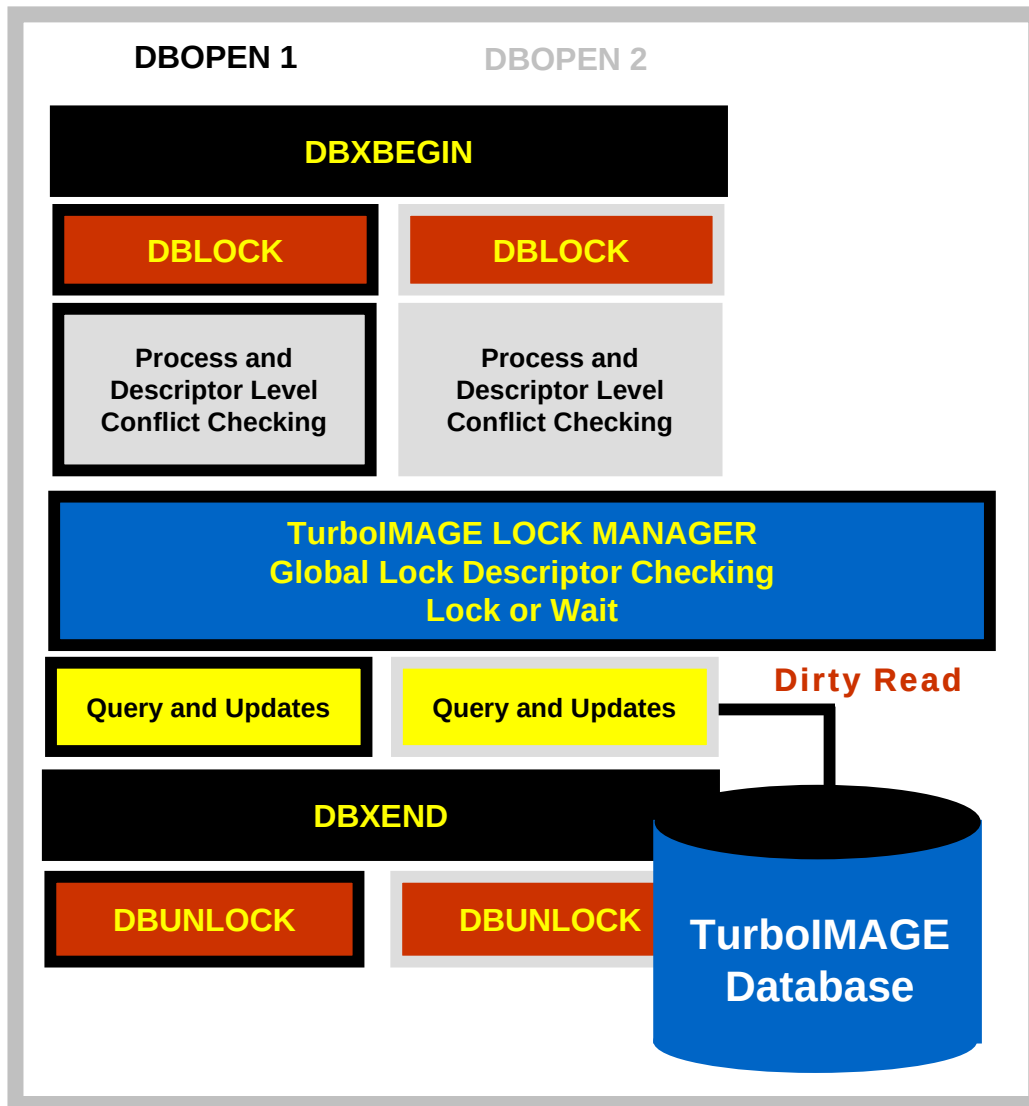


ORACLE

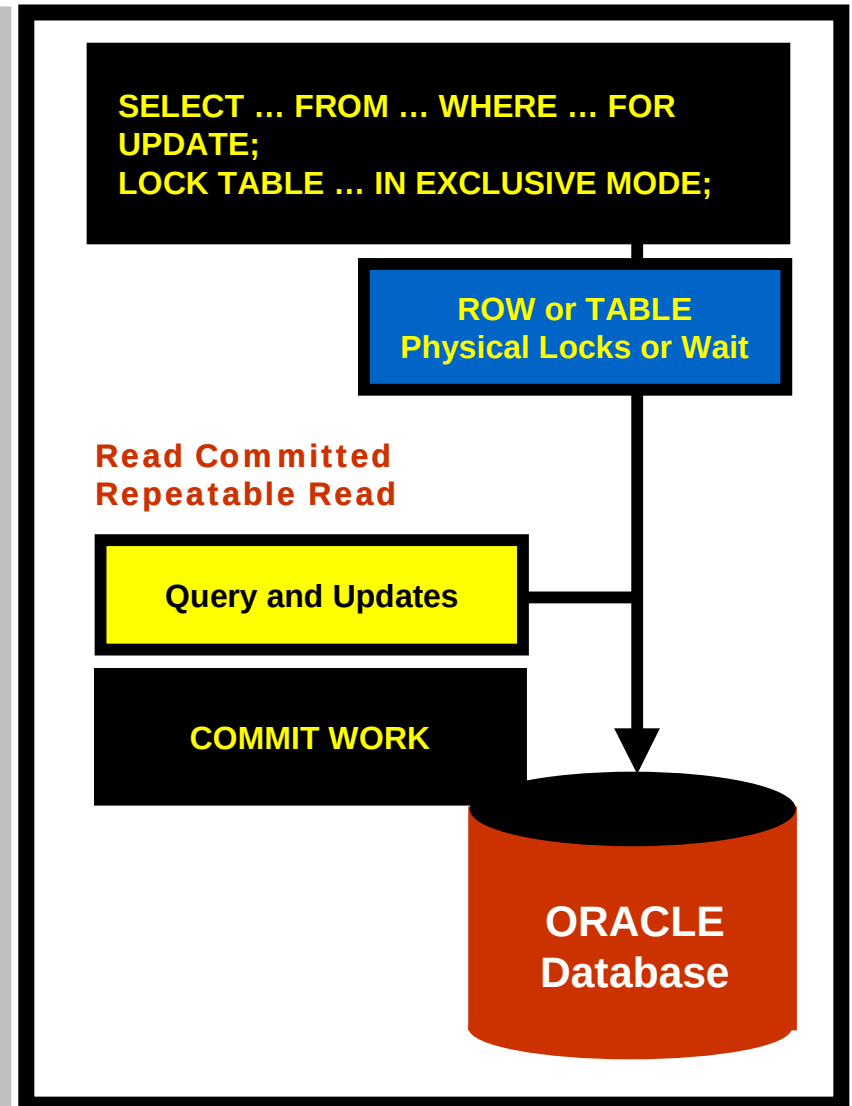


1. Basic Concept – Transaction and Isolation

TurboIMAGE



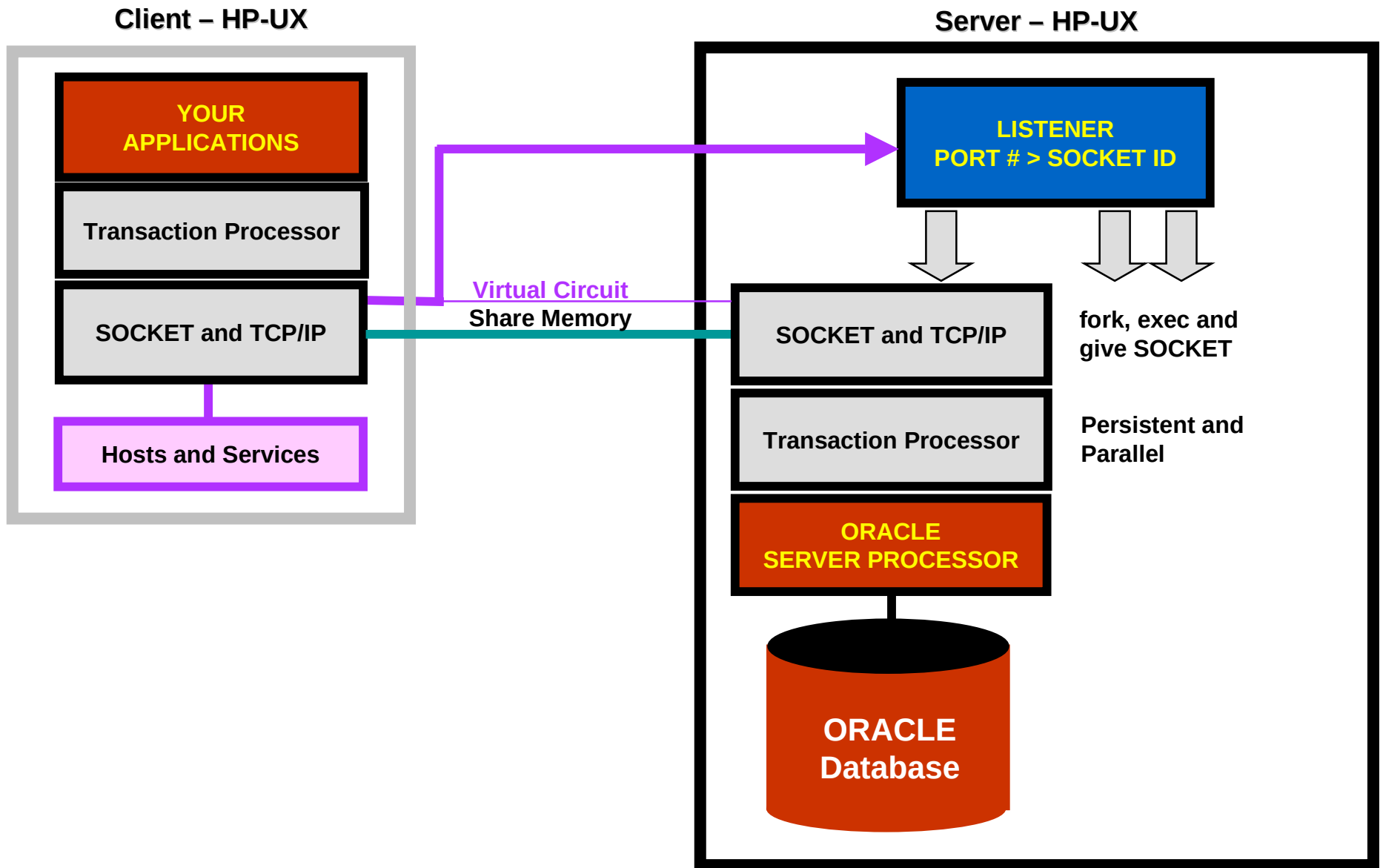
ORACLE



1. Basic Concept - Client-Server

- Client – hosts, services and protocol (TCP/IP vs **NetIPC**)
- Server – hosts, services and protocol (TCP/IP vs **NetIPC**)
- Server – Listener Daemon
- Fork() and Exec() vs **MPE CREATEPROCESS()**
- Pipe, Socket, Share-Memory vs **MPE Message and Map Files**
- Shell vs **MPE CI**
- Persistent and Parallel Server

1. Basic Concept - Client-Server



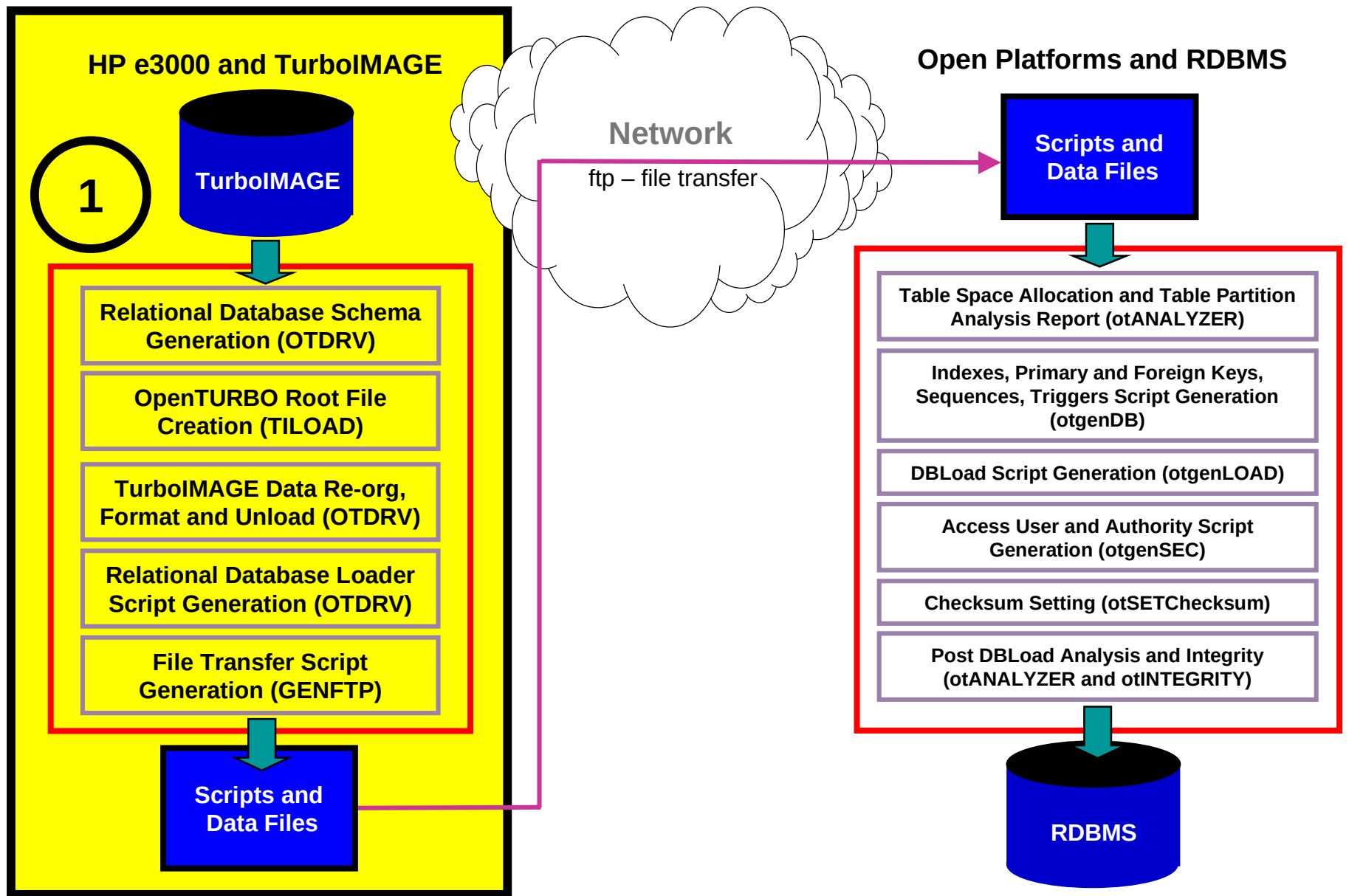
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1

- Generate ORACLE Schema
- Generate TurboIMAGE and ORACLE Transformation Map – Structure, Security, Data Type Conversion Rule, Constraint, Name Space
- Unload Data from Datasets
- Generate ORACLE Table Data Loading Script
- Generate HP e3000 to HP9000 File Transfer Job
- Generate ORACLE version of TurboIMAGE Rootfile
- Real-time Data Replication Tool

Toolset – Transform TurboIMAGE into ORACLE



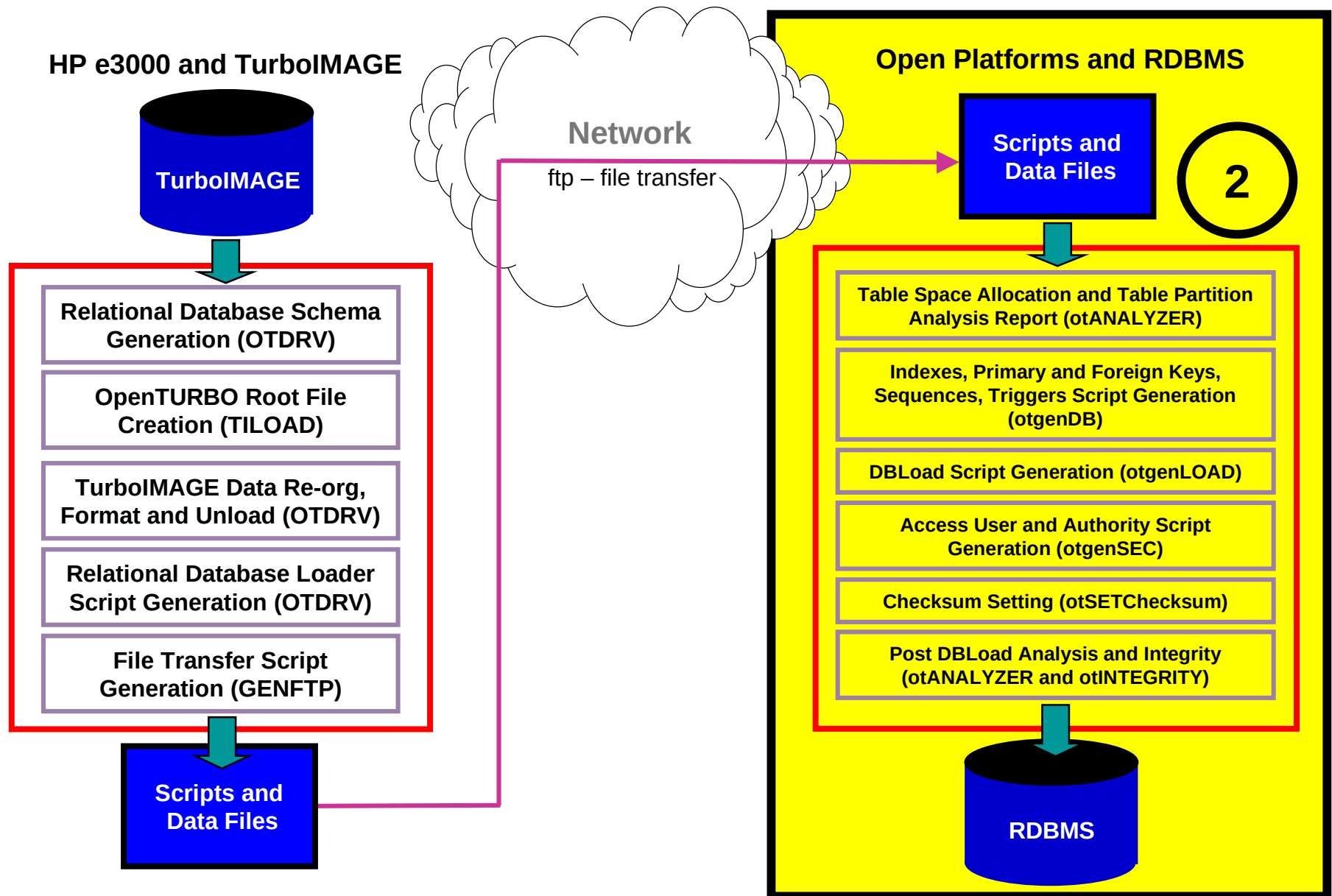
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2

- Create ORACLE Physical Database, Tablespaces and ‘;’ equivalent ORACLE User
- Re-fine all HP e3000 generated scripts for ORACLE
- Build ORACLE Logical Database, Tables, Indexes, Sequences, Triggers, Constraints, Stored Procedures, OpenTURBO Internal used Tables and Views, TurboIMAGE Original Structure, and ORACLE TurboIMAGE Map Info.
- Load Data into ORACLE Tables
- Database Post-loading Validation Reports
- Database Structure Checksum setting

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4. Emulator and How to use it?

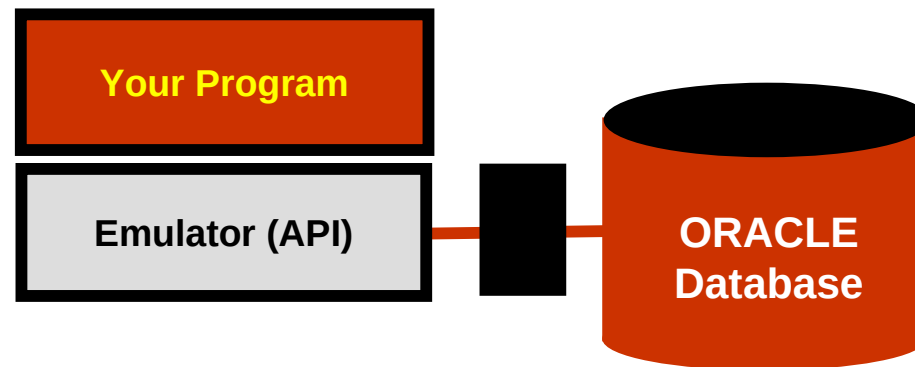
- COBOLII vs UNIX COBOL Filter
- MPE Intrinsic Migration
- COGNOS or SPEEDWARE
- OMIDEX or SUPERDEX
- QUERY.PUB.SYS or SUPRTOOL
- Report Writers – BRW, Crystal, ODBC, JDBC, etc.
- MPE CI and Shell for JCL (Spooler and Reports)
- VPlus or other UI (GUI in Client-Server Mode)

iMaxsoft 4. 4 ways to use emulator

1

Access ORACLE Database

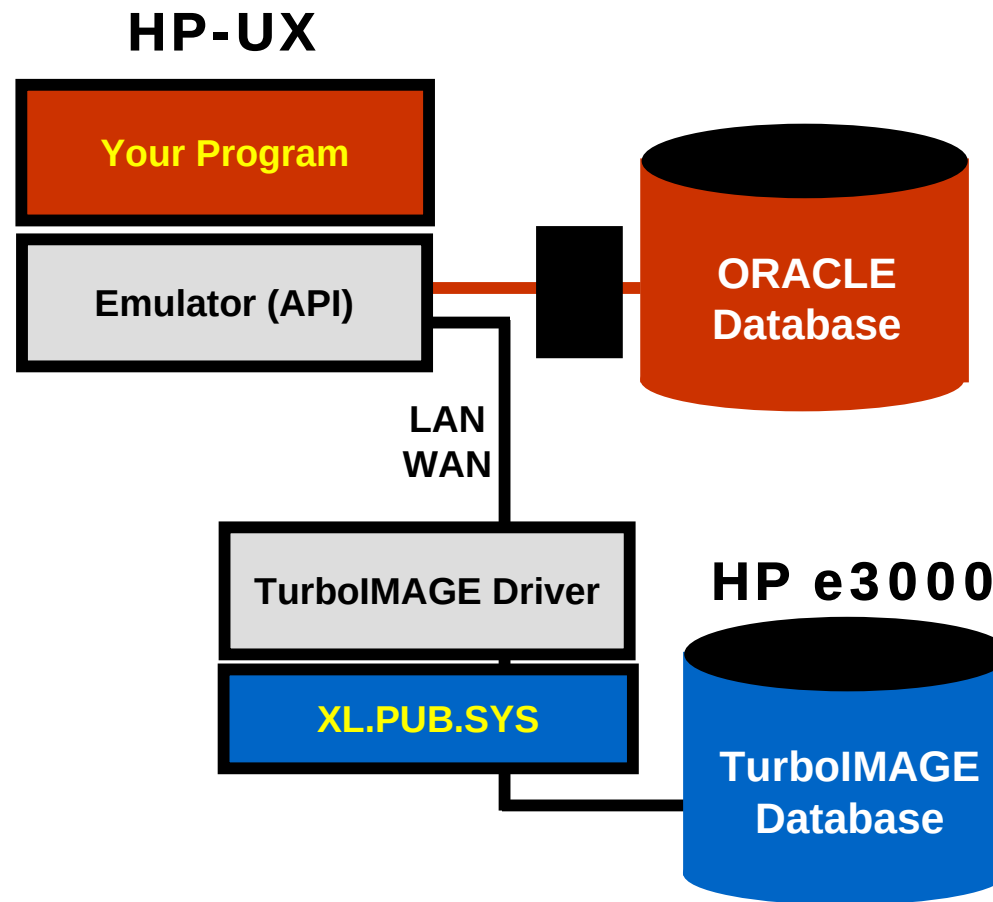
HP-UX



iMaxsoft 4. 4 ways to use emulator

2

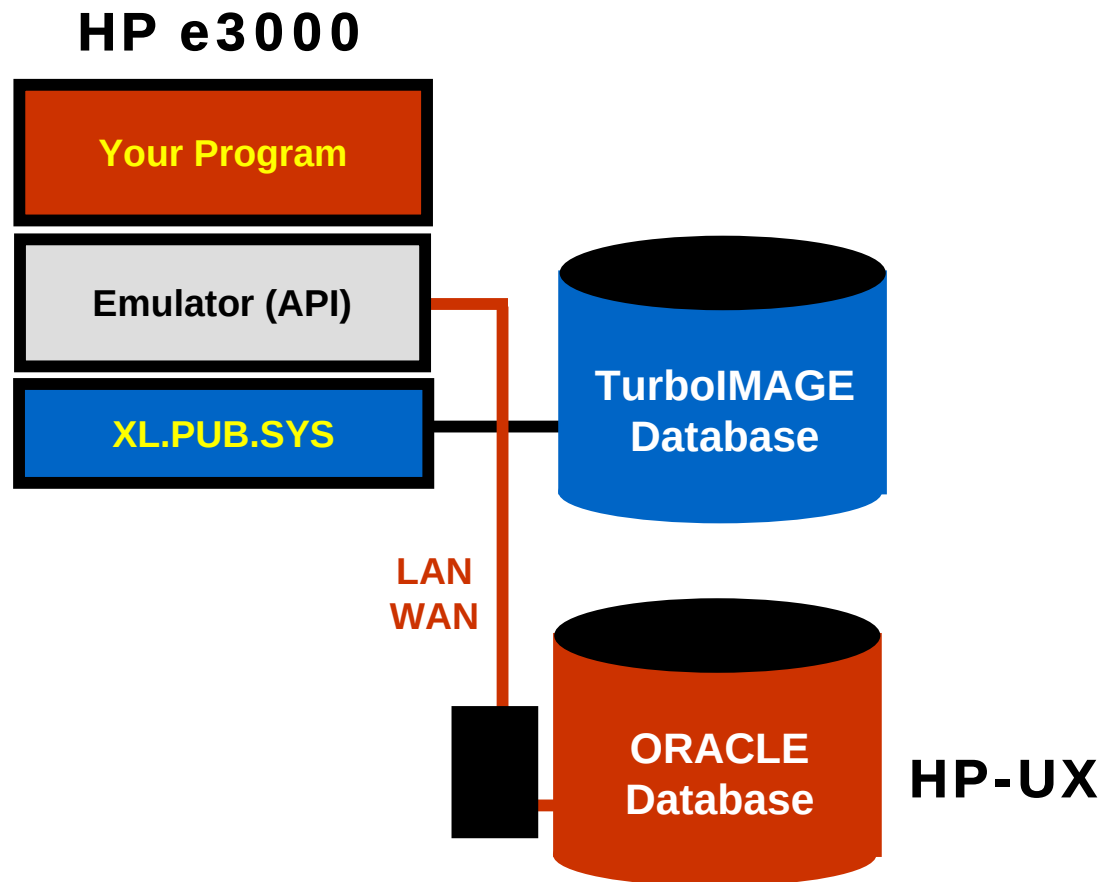
Concurrent Access ORACLE and TurboIMAGE Databases



iMaxsoft 4. 4 ways to use emulator

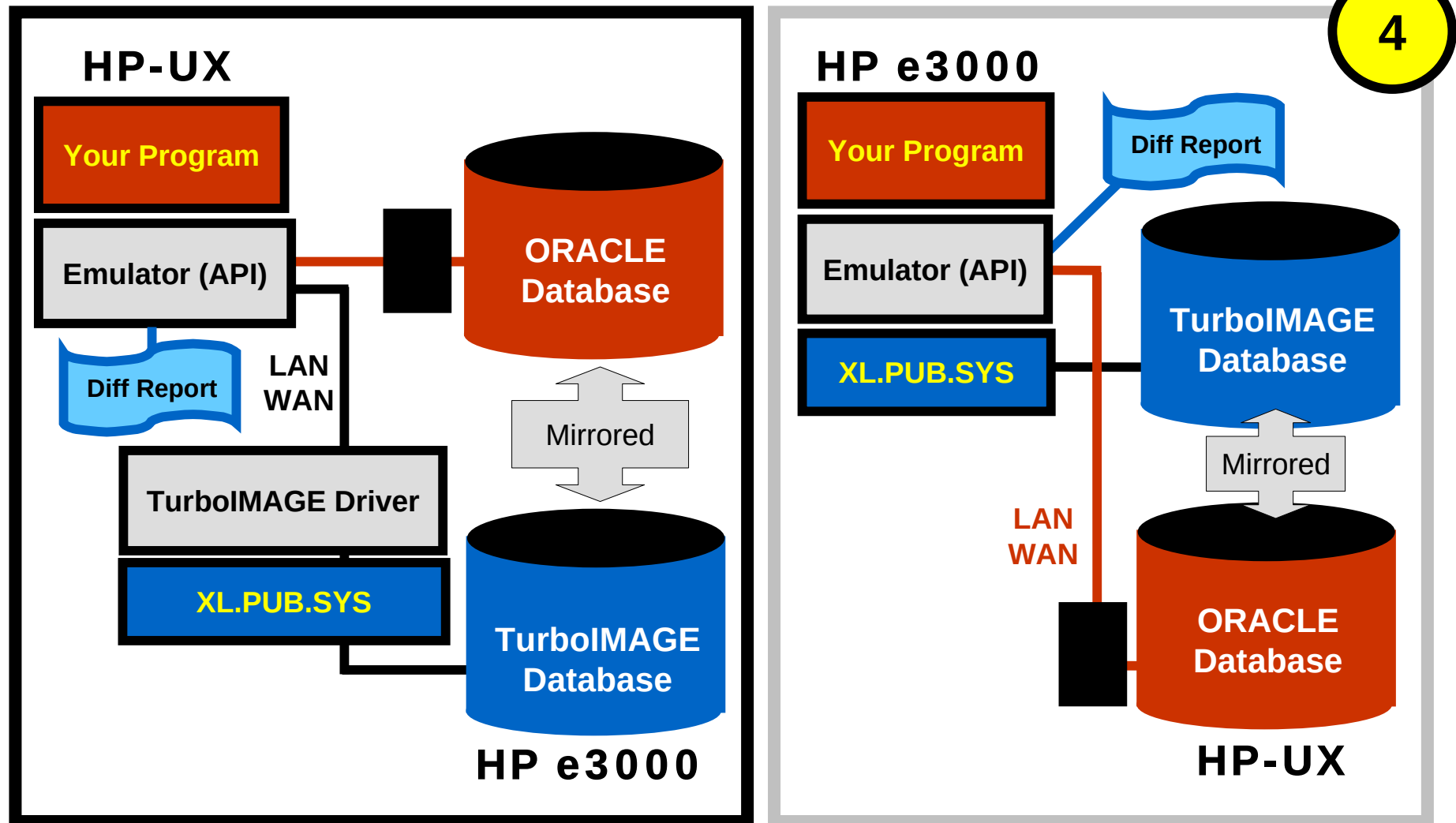
3

Concurrent Access TurboIMAGE and ORACLE Databases

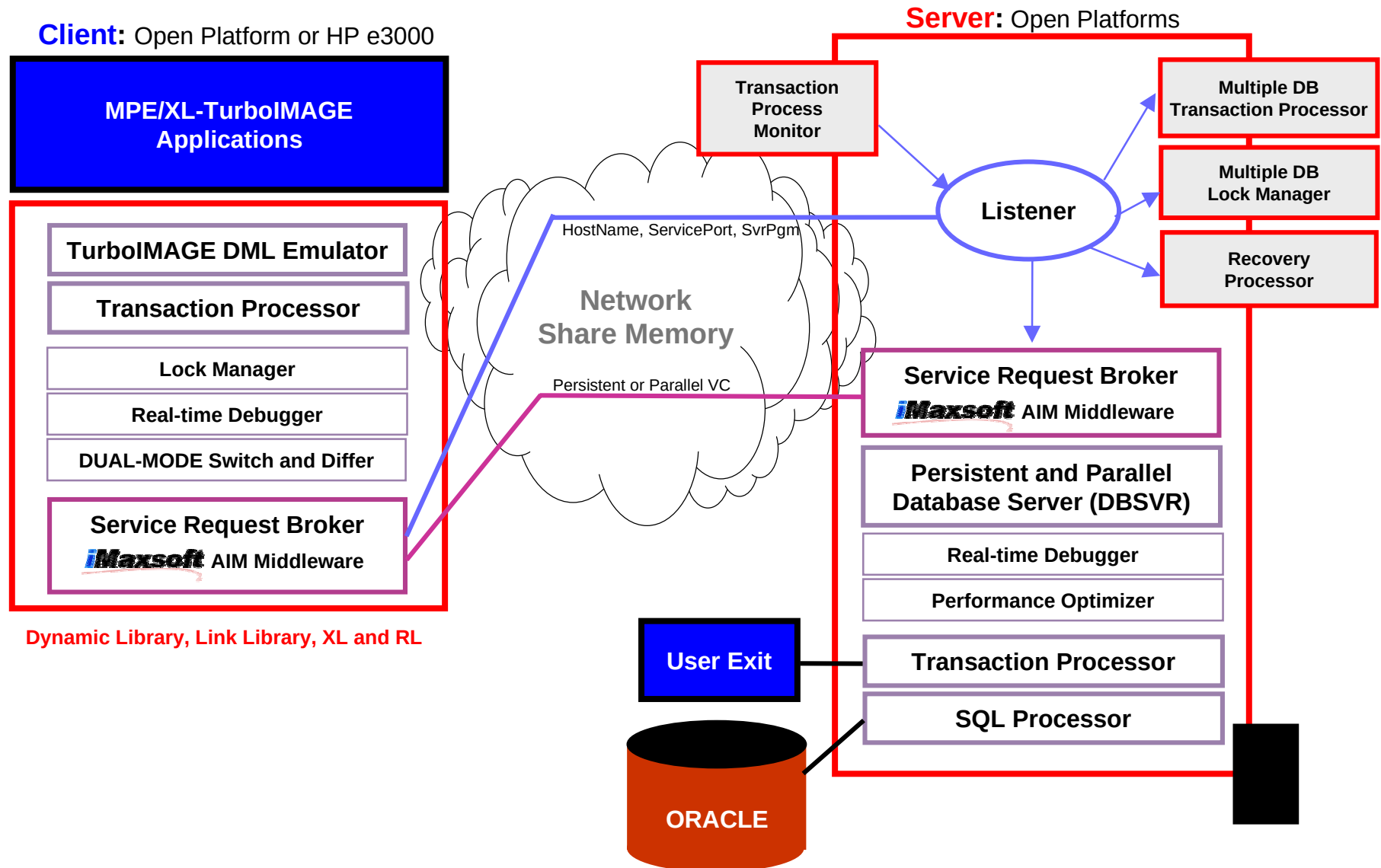


iMaxsoft 4. 4 ways to use emulator

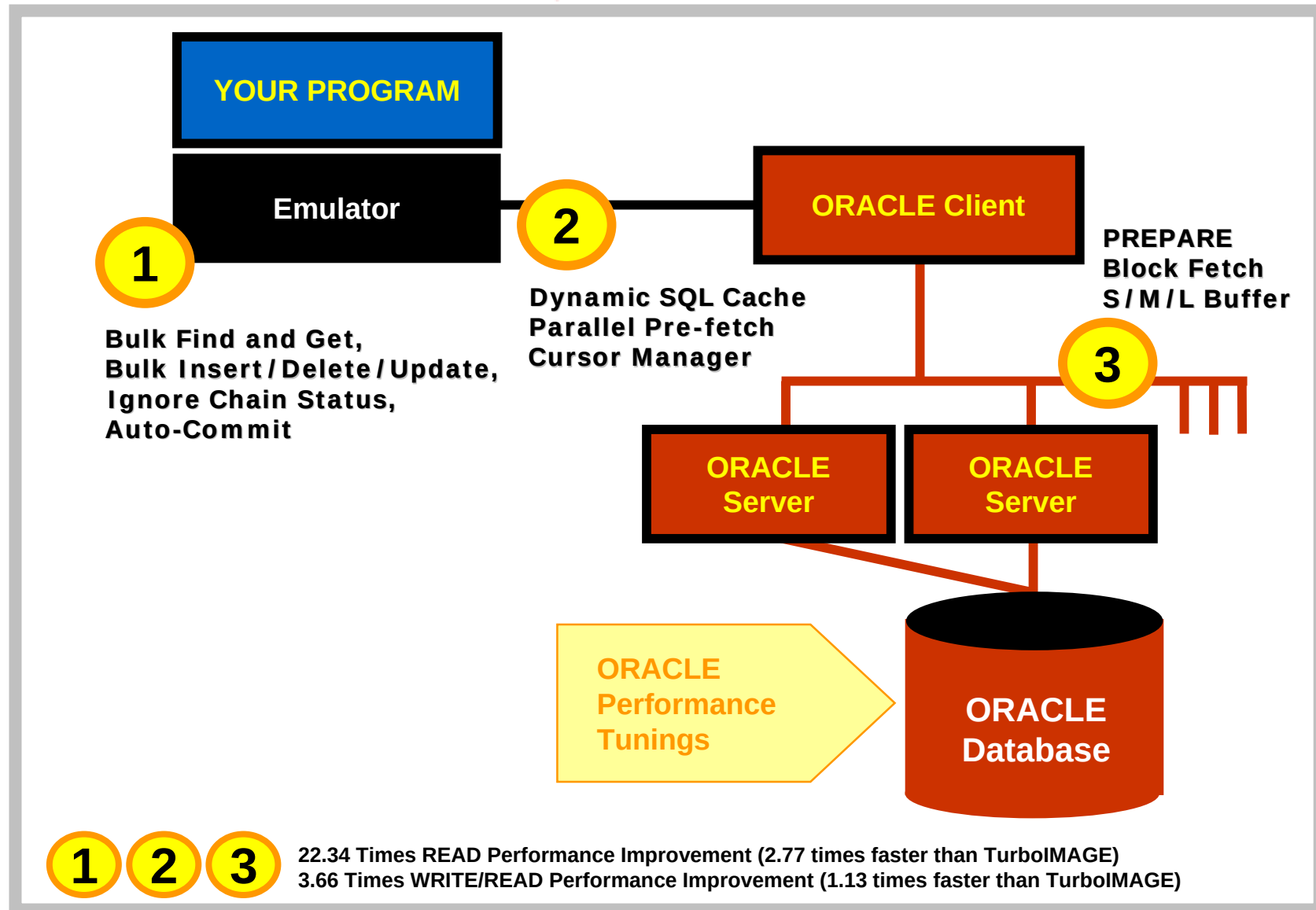
DUAL-MODE - Concurrent Access TurboIMAGE and Mirrored ORACLE Databases



Emulator N-tier Architecture Overview



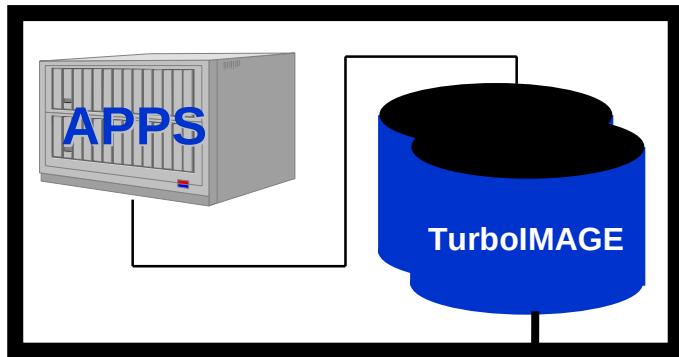
iMaxsoft Performance Tunings



22.34 = 105 / 4.7 (Basic Configuration), 2.77 = 13 / 4.7 (969/200), 1.96 = 9.2 / 4.7 (N4000 2- Way); 3.66 = 64 / 17.5 (Basic Configuration), 1.13 = 13 / 11.5 (969/200)

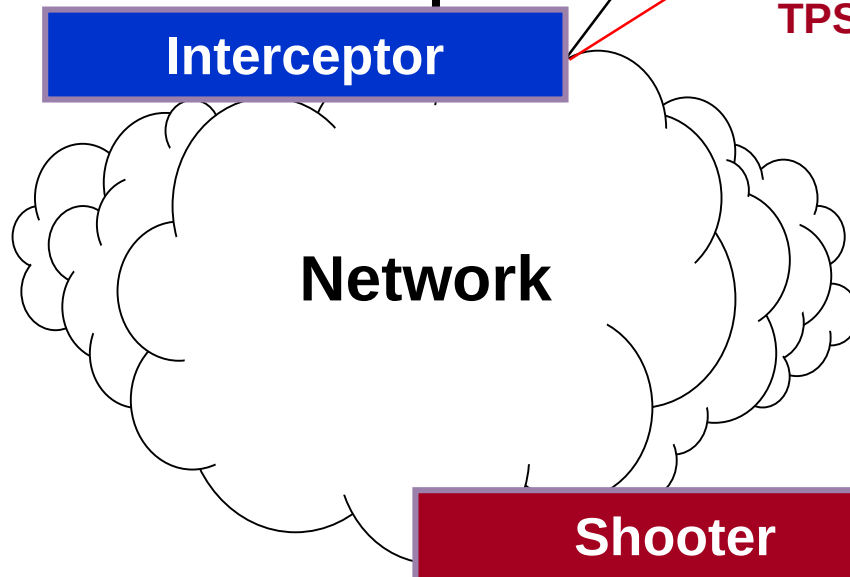
TurboIMAGE Database Replicator

HP e3000 MPE-IMAGE Applications

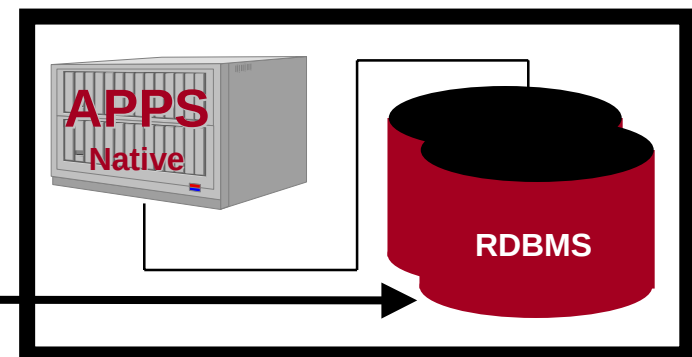


Option 1: Accessing TurboIMAGE Logfile for Updates

Option 2: TurboIMAGE Update API
Real-time Call-back Routines –
TPS (Third Party Shadowing)

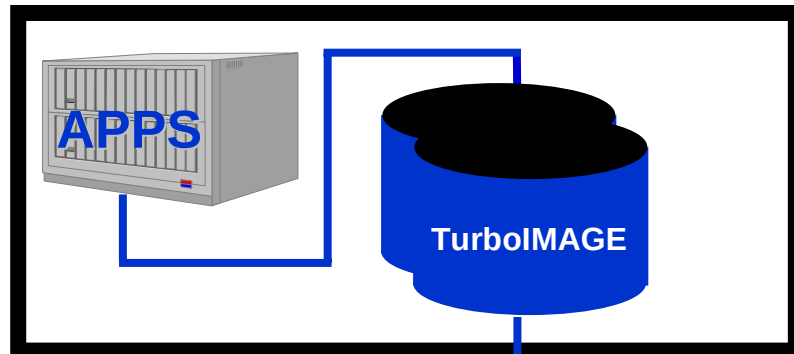


HP-UX ORACLE



Parallel Testing and Developing Environment Zero Impact to your Production Environment

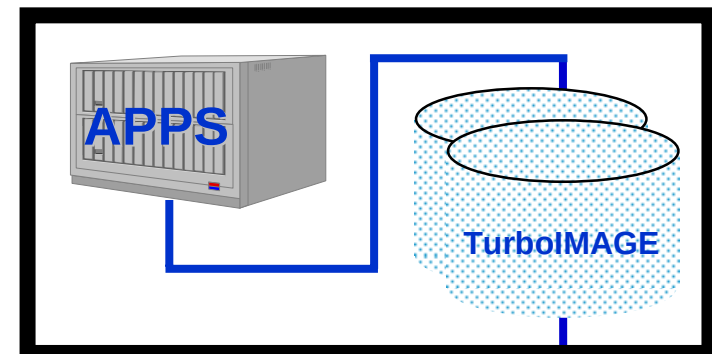
HP e3000 MPE-IMAGE Applications PRODUCTION



Real-time Data Replicator

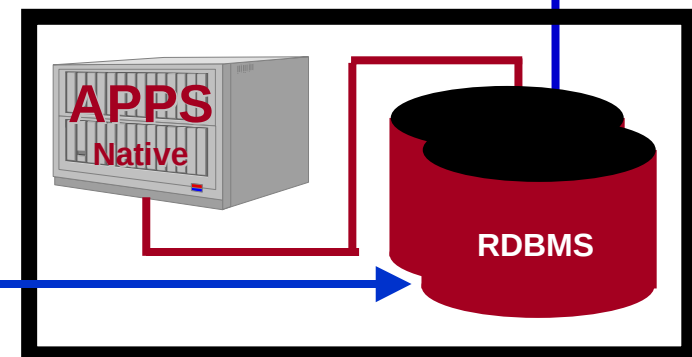
**DB Mirroring
Data Replication
Real Time Mode**

HP-UX ORACLE Migration Development Environment



TurboIMAGE Emulator

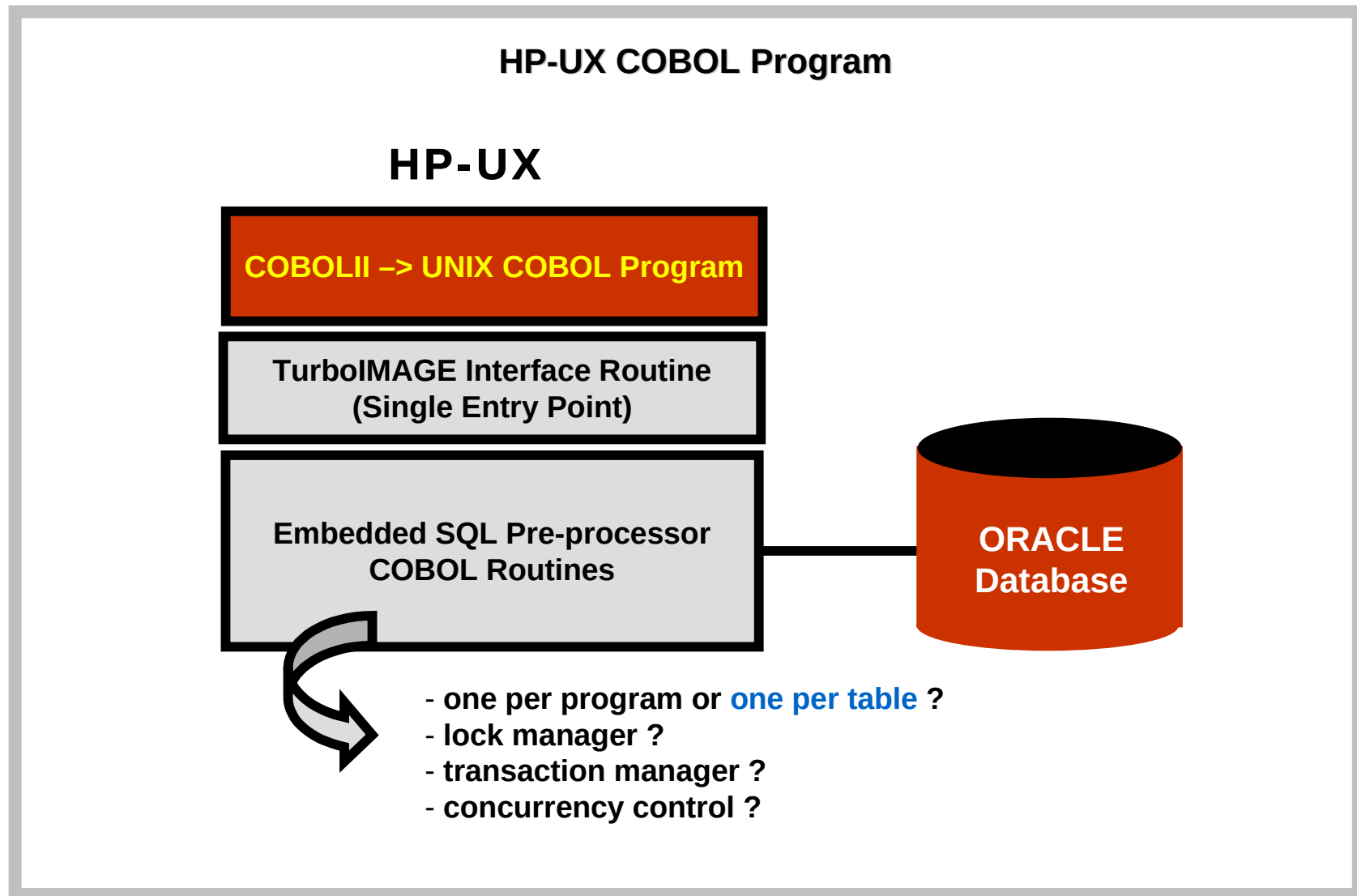
ORACLE Native Apps Development Environment



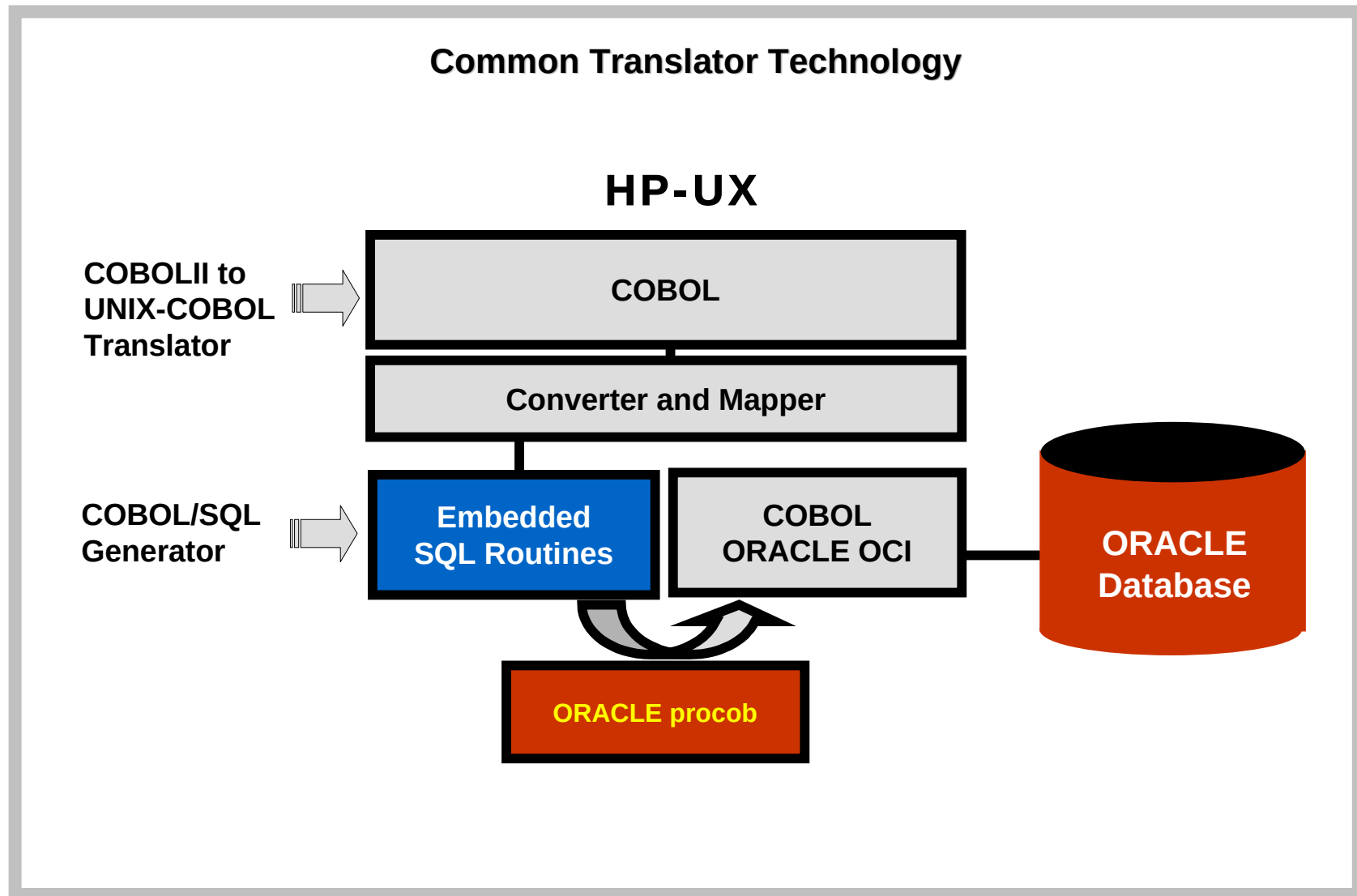
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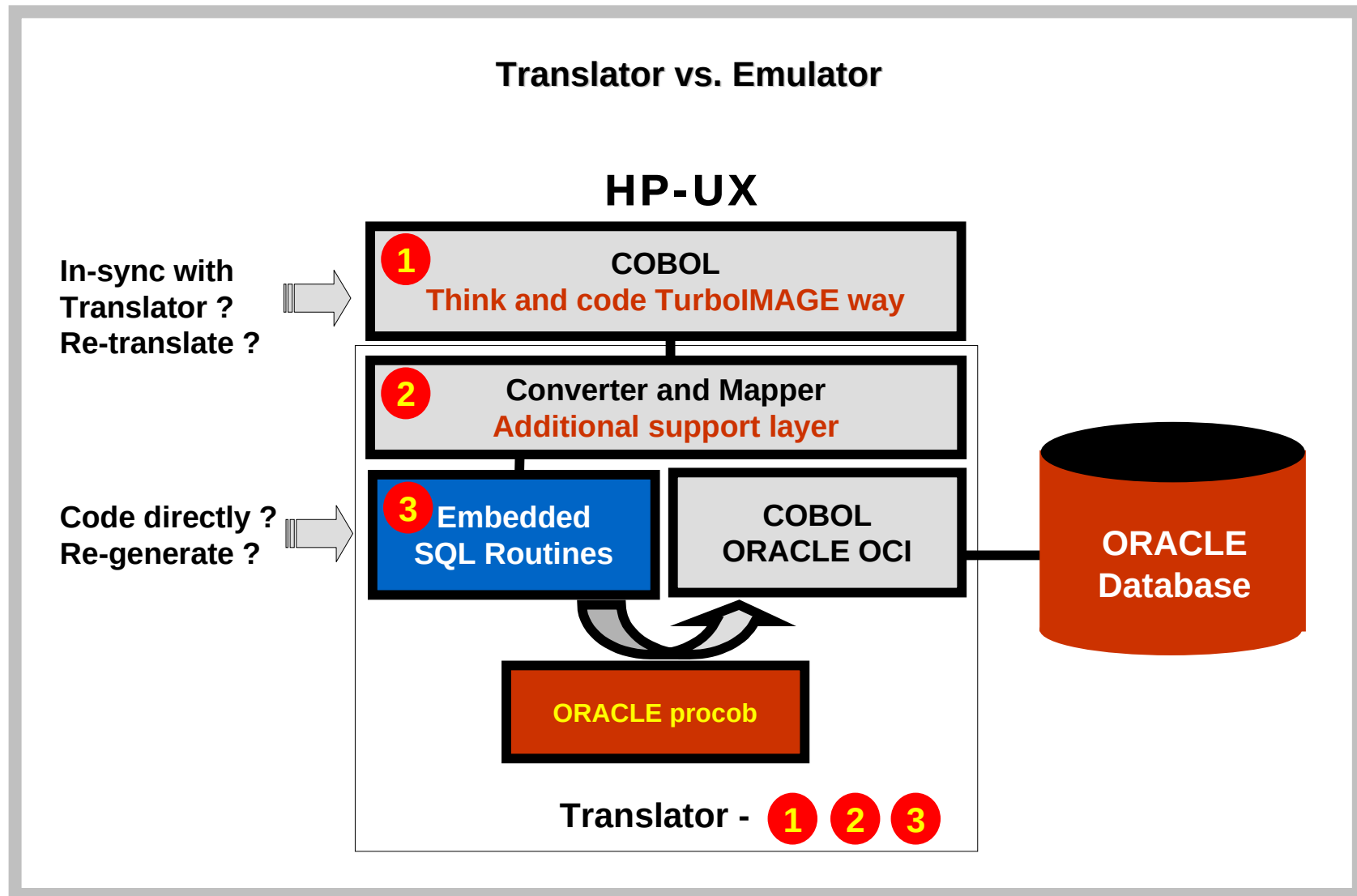
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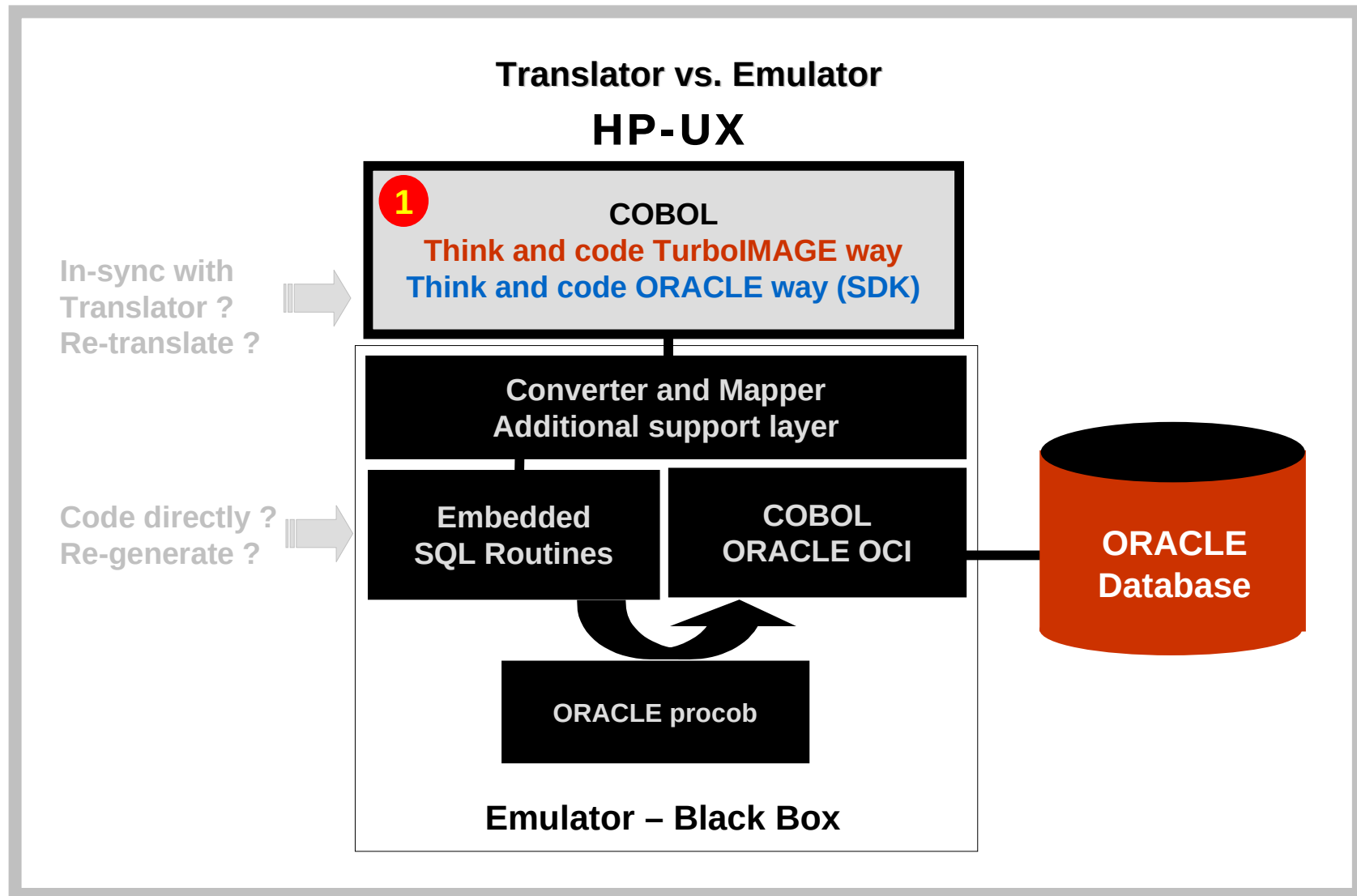
iMaxsoft 5. Translator



iMaxsoft 5. Translator

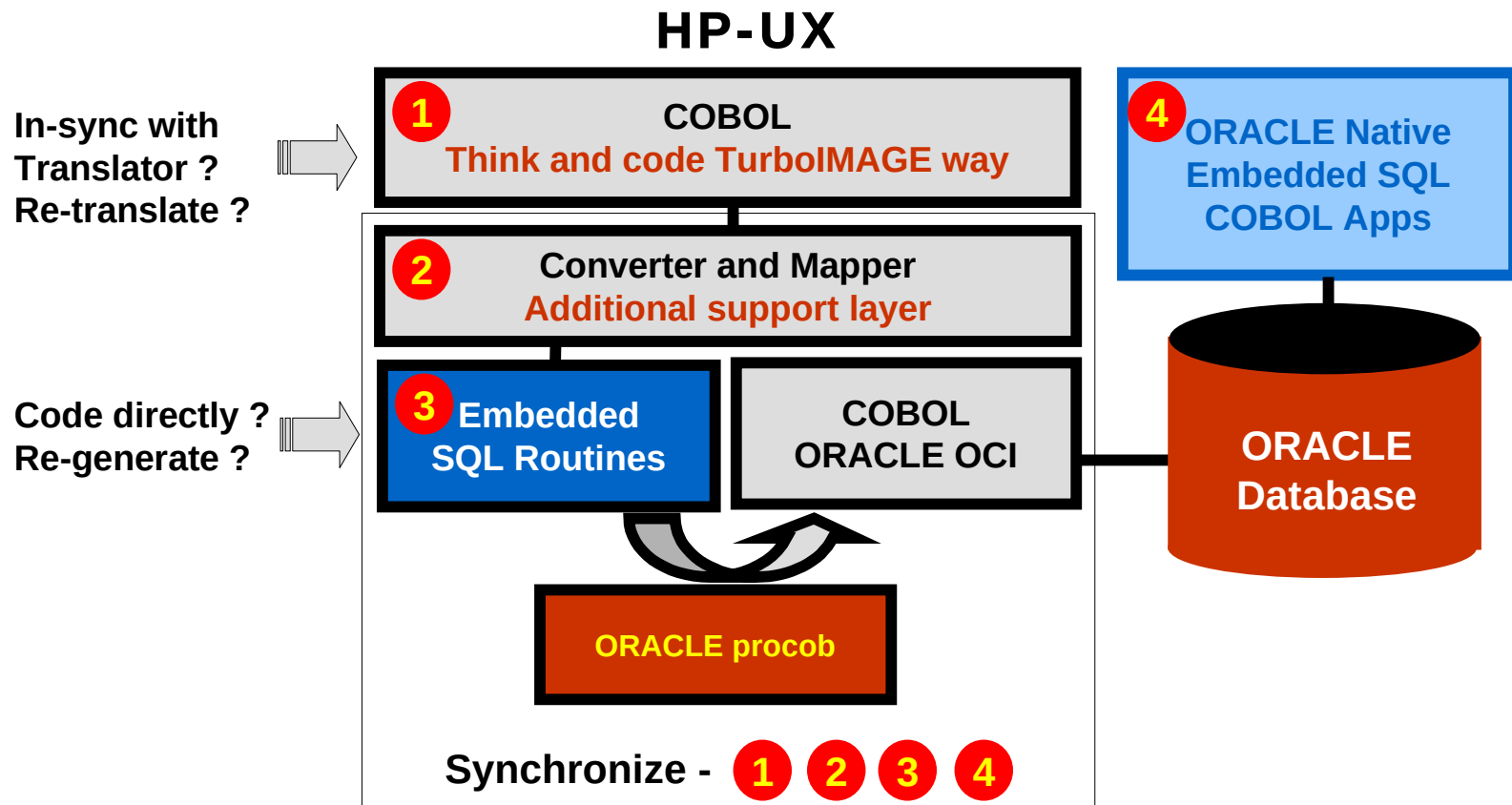


iMaxsoft 5. Translator

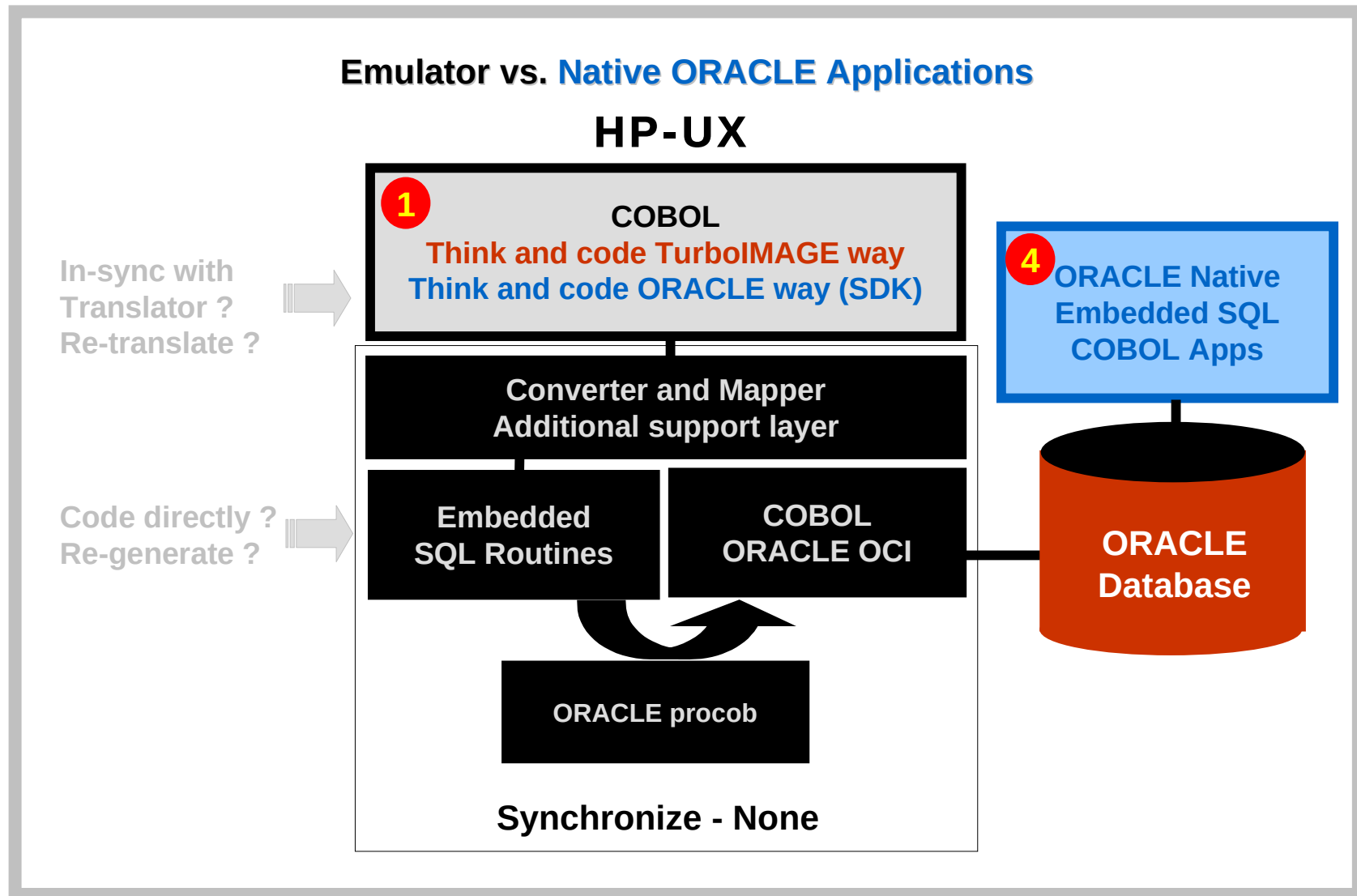


iMaxsoft 5. Translator

Translator vs. Native ORACLE Applications



iMaxsoft 5. Translator



5. Translator and Emulator - General Discrepancies

- ORACLE Database – instances vs users and owners, security vs users and authorities, concurrency (DB Exclusive Mode and MR),
- Locking Strategy – physical ROW or TABLE vs abstract, deadlock detection, unconditional lock may wait for-ever, operation ‘show lock’ and ‘free lock’, multiple DBLOCK calls and multiple-lock-entries descriptor, DB level unique key (sequence), . . . etc.
- Transaction Isolation and Commit / Rollback - ORACLE vs ANSI SQL, transaction isolation override, when and how to end a transaction, how to handle TurboIMAGE error condition in your existing program when unexpected status is returned, auto-commit, transaction and rollback segment / audit-log, . . . etc.
- CURSOR Control and OPEN / CLOSE – number of cursors per instance, number of cursors per process, multiple concurrent cursors support, close at commit / rollback, . . . etc.
- Pre-processor Embedded SQL Code Generator – one per table, one per program, auto-code-gen, manual-code-gen, generic or specific to each program, . . . etc.
- Others - item list (@;), DBX-calls, performance tuning capability (types of DBFIND and DBGET), . . . etc.
- Maintenance – TurboIMAGE calls, io-interface, PSQL, and ORACLE database.

5. Translator and Emulator – DBA & Operation

- Logical TurboIMAGE and ORACLE Instance - on-line or off-line backup, roll-forward and roll-backward recovery, database startup and shutdown, full and partial database restore, . . . etc.
- DBUTIL alike tool for dead-lock detection and protection - show users, kill users, show locks, free locks, . . . etc.
- Database integrity checking - objects, structure, authorities, triggers, stored procedures, . . . etc.
- ORACLE performance tuning – indexes, query analyzer and run-plan enforcement, resource and SGA management, buffering, pre-fetching and look-ahead, concurrency control, . . . etc.
- Synchronization of TurboIMAGE and ORACLE structure – dataset vs table, data field vs table column, path vs constrain and index, . . . etc.
- Synchronization of TurboIMAGE calls and ORACLE SQL code – more efforts if it is one Pre-processor SQL code per program; in general, any TurboIMAGE access changes or database changes require at least concurrency and throughput re-certification. Example, in TurboIMAGE, if all databases and datasets are locked via the order of their names, no dead-lock will occur, but in translator, unless you have a LOCK MANAGER, otherwise it would be a disaster.
- Synchronization of TurboIMAGE and ORACLE data types – integer vs character, short integer (16) vs long integer (32 or 64), packed decimal and zoned decimal, character with binary data, integer vs date and time, character vs date and time, . . . etc.

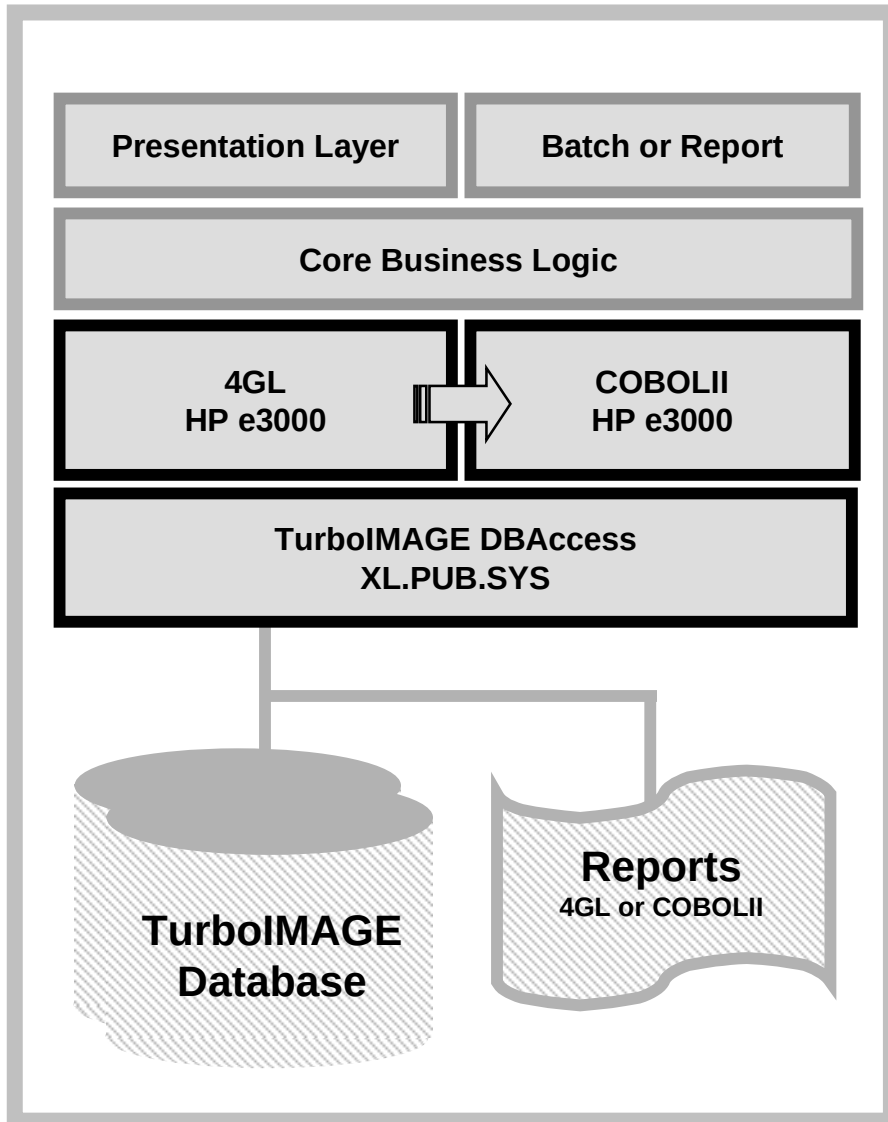


Conclusion

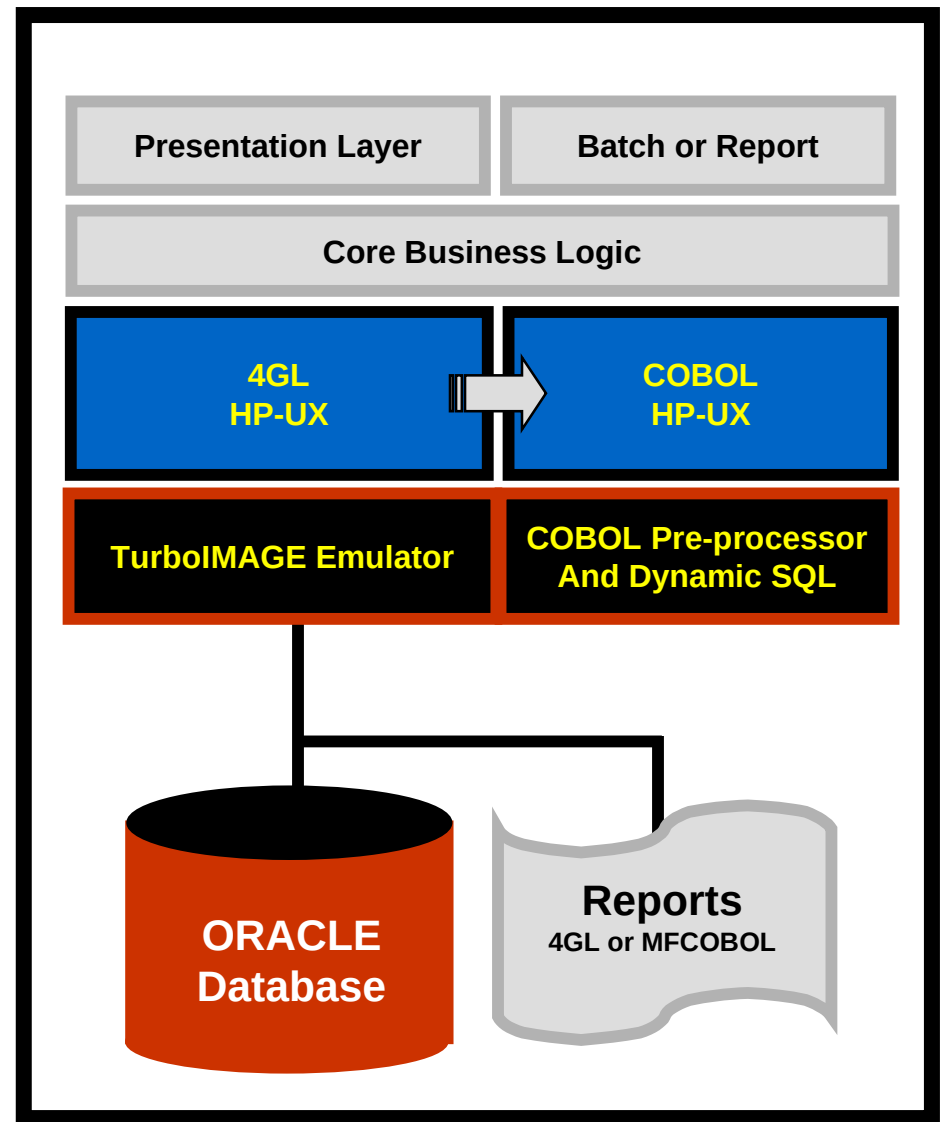
- Emulator – simple, risk-free and straightforward (step one only?)
- Translator – questionable, but is closer to native (dynamic or static SQL)
- Native and co-existence
 - LOCKING strategy
 - TRANSACTION strategy

Migration Overview

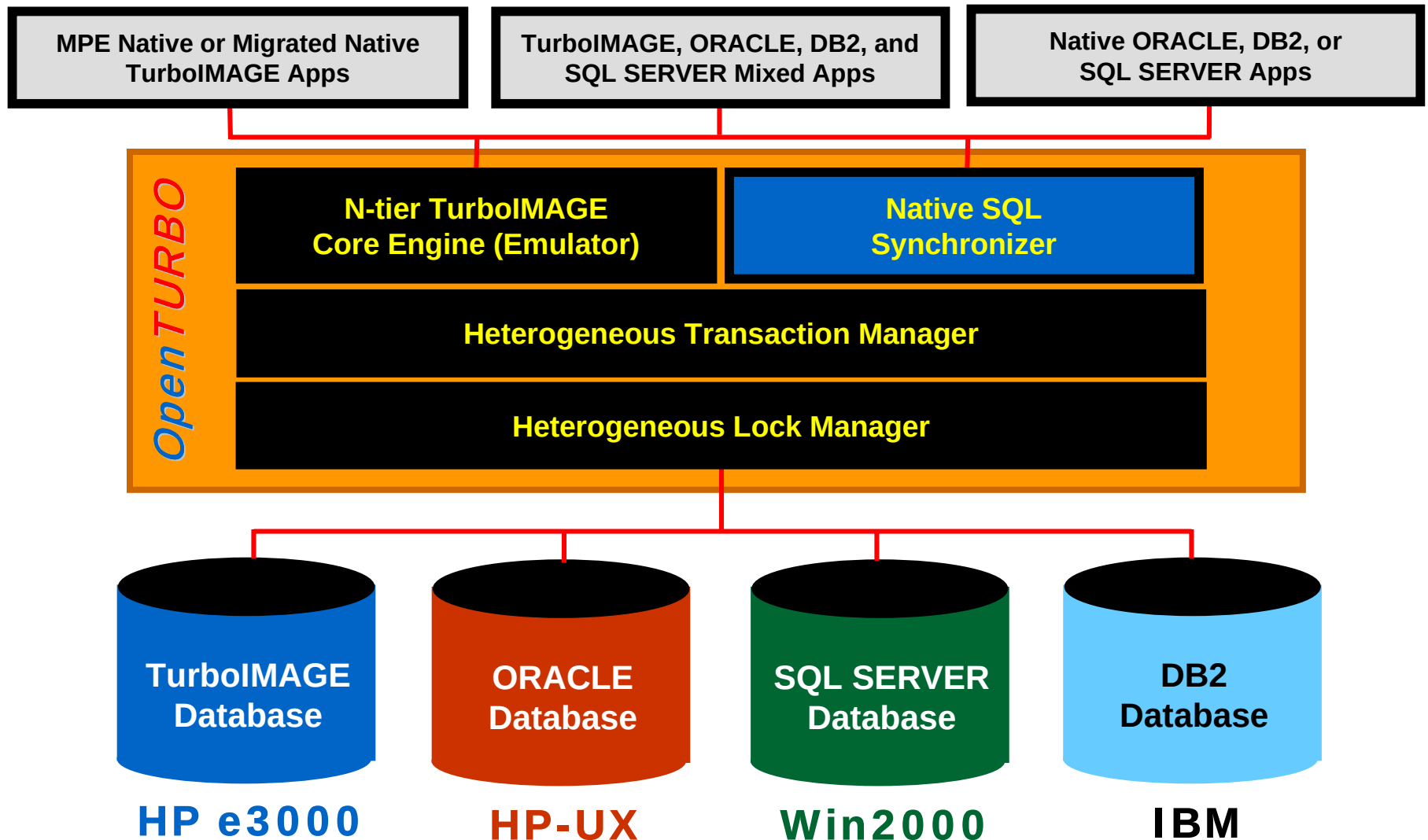
HP e3000 and TurboIMAGE



HP-UX and ORACLE



iMaxsoft OpenTURBO Technology



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Database Transformation

HP e3000 TurboIMAGE Demo



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OpenTURBO

Database Transformation

HP-UX Oracle Demo and DBAQ



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OpenTURBO Demo

**QUERY.PUB.SYS, OTDRV Test Driver,
and Debugging Facilities**

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OpenTURBO Q & A